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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/802,121 | 03/16/2004 | Robert W. McCullough | QI21141 | 3527 |
| 32912 7590 01/30/2007 HAYWARD A. VERDUN, LLP P.O. BOX 698 CENTERVILLE, LA 70522 | | | EXAMINER JAGAN, MIRELLYS | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2859 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS | 01/30/2007 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| | | | |
|------------------------------|-----------------|-------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/802,121 | MCCULLOUGH ET AL. | |
| | Examiner | Art Unit | |
| | Mirellys Jagan | 2859 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9, 12-21 and 30-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 12-21 and 30-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The Replacement drawing sheet correcting figures 4 and 5A-5D were received on 10/31/06 and are approved.

Claim Objections

2. Claims 8, 9, and 30-33 are objected to because of the following informalities:

It is not clear in claim 8 which one of the plurality of IR focal plane arrays claimed in claim 7 is being referred to by the phrase "the IR focal plane array".

Claims 30-33 are drawn to a method in the preambles, but the bodies of the claims are drawn to an apparatus.

Claim 32 appears to state that there are two separate means for analyzing, one as claimed in base claim 31, and the other (using a computer processor) as claimed in claim 32. Therefore, it is not clear if claim 32 is further describing the means for analyzing claimed in base claim 31, or if it is claiming that there are two separate means for analyzing.

Claim 9 is objected to for being dependent on objected base claim 8. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 30-33 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,562,345 to Heyman et al [hereinafter Heyman].

Heyman discloses an apparatus for testing a structure, the apparatus comprising:

means for injecting induction energy volumetrically within an interior of a composite laminated structure;

means for monitoring temperatures at a surface of the structure caused by diffusion of the volumetrically deposited energy;

means for analyzing the temperatures by a computer processor; and

means for determining whether there is a flaw present in the structure (see column 1, lines 25-31; column 3, lines 44-49 and 54-57; and column 5, lines 10-17, 29-35, and 46-49).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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6. Claims 1-9, 12-16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heyman in view of U.S. Patent 6,394,646 to Ringermacher et al [hereinafter Ringermacher].

Heyman discloses a method of testing a structure comprising:

depositing induction energy volumetrically below a surface within at least a portion of a volume of the structure;

detecting transient temperatures at a surface of the structure caused by diffusion of the energy using an IR detector;

automatically analyzing the detected transient temperatures by a computer processor;

determining whether a flaw is present in the structure;

recording a location of one or more detected flaws in the structure; and

providing a visual indication when a flaw is detected;

wherein the deposited energy is induction heating; the diffusion of the deposited energy forms a pattern; the frequency of the deposited energy is varied to produce a resonating effect within the structure; the deposited energy includes multiple high and low band energy frequencies; the structure includes a composite metallic portion and a non-metallic portion, i.e. two dissimilar materials (composite laminated structure) (see column 1, lines 25-31; column 3, lines 44-49 and 54-57; and column 5, lines 10-17, 29-35, and 46-49).

Heyman does not disclose the IR detector being an IR focal plane array wherein the array is an IR video camera, or the using a plurality of IR focal plane arrays.

Ringermacher discloses that it is known in the art to use an IR video camera in thermography techniques to test a composite structure for flaws. The IR video camera is useful

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since it records and stores successive thermal images of the structure over time to visually obtain the presence of the flaw (see column 2, lines 36-52).

Referring to claim 1, would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Heyman by replacing the IR detector with an IR video camera since Ringermacher discloses that IR video cameras are commonly used in the art as IR detectors in thermographic testing of materials for recording and storing the presence of flaws.

Referring to claim 7, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Heyman and Ringermacher by providing additional IR focal plane arrays, i.e. plurality of video cameras, to detect transient temperatures at a plurality of locations simultaneously in order to reduce the testing time of a large structure, and since it has been held that the mere duplication of the essential working parts of a device involves only routine skill in the art. See *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

7. Claims 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heyman and Ringermacher, as applied to claims 1-9, 12-16, and 18 above, and further in view of the prior art disclosed by Applicant on paragraph 63 of the specification [hereinafter Prior Art].

Heyman and Ringermacher disclose a method having all of the limitations of claims 17 and 19, as stated above in paragraph 6, and further discloses that thermographic techniques are used in the art for testing flaws in laminated structures such as those used in the aerospace industry, i.e., the laminated structure is an aircraft (column 1, lines 25-31).

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Heyman and Ringermacher do not disclose the material of the aircraft being comprised of a metal, a boron-epoxy skin, and a honeycomb panel.

It is known in the Prior Art that a typical composite structure used on some major aerodynamic surfaces, such as an F-14 and F-15 fighter aircraft, is made up of a metal, a boron-epoxy skin, and a honeycomb panel.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Heyman and Ringermacher by replacing the structure with a structure as known in the Prior Art, since the prior art teaches that the structure is typically used in the art as the structure of an aircraft.

8. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heyman, Ringermacher, and the Prior Art, as applied to claims 17 and 19 above, and further in view of U.S. Patent 5,709,469 to White et al [hereinafter White].

Heyman, Ringermacher, and the Prior Art disclose a method having all of the limitations of claims 20 and 21, as stated above in paragraph 7, except for the structure being the wing of the F-15.

White discloses that the wing of an aircraft is an important structure to thermally test for flaws since it experiences stress during flight and therefore is likely to incur flaws (column 1, lines 18-27 and 40-42; and column 2, lines 25-31).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Heyman, Ringermacher, and the Prior Art by

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testing the wing of the aircraft since White teaches that the wing is a location of an aircraft that is likely to incur flaws during flight.

9. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heyman and Ringermacher, as applied to claims 1-9, 12-16, and 18 above, and further in view of U.S. Patent 7,044,634 to Sandvoss.

Heyman and Ringermacher disclose a method having all of the limitations of claim 34, as stated above in paragraph 6, except for providing a user with an auditory indication when a flaw is detected.

Sandvoss discloses a thermography method for detecting sub-surface disturbances, wherein an alarm is prompted when a disturbance is detected in order to alert a user to the presence of a disturbance (see column 4, lines 47-50; and column 10, lines 6-11).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Heyman and Ringermacher by providing a user with an auditory indication when a flaw is detected since Sandvoss teaches that it is desirable to prompt an alarm when a flaw is detected in order to alert a user to the presence of a flaw.

Response to Arguments

10. Applicant's arguments with respect to independent claims 1 and 30 have been fully considered but they are not persuasive.

Applicant's arguments that Heyman fails to disclose the injection of induction energy volumetrically below the surface of the structure are not persuasive since Heyman specifically

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states in column 5, lines 29-35 that he injects induction energy (heat) into the surface of the structure, i.e., volumetrically, so that, if a disbond is present, the surface temperature profile will show the region of the disbond.

Furthermore, Heyman states in column 2, lines 10-14 that the heat source heats a region of a surface of a test structure to a desired depth below the surface, i.e., volumetrically, wherein the frequency of the heating source can be varied to heat to the desired depth.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mirellys Jagan whose telephone number is 571-272-2247. The examiner can normally be reached on Monday-Friday from 11AM to 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on 571-272-2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJ
January 23, 2007



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